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ABSTRACT

The first of two assumptions underlying the thesis of this paper is that, in the face of escalating costs, uneven demographics, faltering revenues, and a serious erosion of public confidence, United States higher education must become more productive. Universities and colleges of all types must produce demonstrably more education, research, and training for the resources requested from students, parents, and taxpayers. Increasing productivity is an imperative of every important sector of the economy and consequently the need for higher productivity is compelling. The second assumption is that productivity advance cannot be achieved wholly or even primarily through the traditional approach of reducing or cheapening the inputs--mainly faculty and staff--while defining enrollment as the "output" and holding it constant or forcing it to increase. From these two assumptions follows the central thesis of this paper: that significant and sustainable productivity advances in higher education must be achieved through greater attention to the learner. Learning productivity relates the input of faculty and staff, not to enrollments or to courses taught or to credit or classroom hours but to the demonstrated mastery of a defined body of knowledge or skills. Learning productivity can be increased through greater institutional efficiency, measures that lead to more learning from students, individually paced mastery learning, application of appropriate educational technology, emphasis on students focusing their studies sooner, year-round study, opening college doors to younger students, and beginning graduate and professional education at an earlier age. Includes 20 reference notes. (JB)

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Learning Productivity: A New Imperative for American Higher Education

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D. Bruce Johnstone

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Learning Productivity: A New Imperative for American Higher Education

I
The Productivity of Learning

American higher education in the last decade of the twentieth century faces escalating costs, uneven demographics, faltering revenues, and a serious erosion of public confidence — not of its fundamental importance, but of its institutional integrity and stewardship. The failure to surmount these challenges could well lead to losses that are serious and irrevocable: losses in the quality of faculty and campus infrastructure; losses in access and in the social and economic mobility that we have come to expect from American higher education; and losses to our economic vitality from a higher education system no longer serving our needs either for a trained work force or a competitive technology.

The first of two assumptions underlying the thesis of this paper is that American higher education must become more productive. That is, our universities and colleges — public and private, selective and open access, research universities and community colleges — must produce demonstrably more education, research, and training for the resources requested from students, parents, and taxpayers. Increasing productivity is, at least arguably, an imperative of every important sector of our economy. For higher education — whose unit costs have consistently increased at rates exceeding even its own wage and salary increases, whose costs to the student and parent now exceed the reach of all but the most affluent families, and for which a major increase in state or federal tax support remains remote — the need for higher productivity is compelling and urgent.

The second assumption is that this productivity advance cannot be achieved wholly or even primarily through the traditional approach of reducing or cheapening the inputs — mainly faculty and staff — while defining enrollment as the "output" and holding it constant or forcing it to increase. Such an approach attempts to solve the problem of insufficient resources by reducing the number of faculty and staff and then increasing their workloads — i.e., the number of courses they teach or the number of students per course, or the number of advisees or independent study students or postdoctoral students each remaining faculty must cover. Such an approach, for most of America's 3,500 colleges and universities, has more than run its course, and continuing to add to faculty and staff workload, while always possible, will increasingly bring commensurate or more than commensurate losses in higher education's real outputs of learning, research, and public service.

From these two assumptions follows the central thesis of this paper: that significant and sustainable productivity advances in higher education must be achieved through greater attention to the learner. *Learning productivity* relates the input of faculty and staff not to enrollments or to courses taught or to credit or classroom hours assigned, but to learning — i.e., to the demonstrated mastery of a defined body of knowledge or skills. When the object of critical inquiry is learning and learners, rather than merely teaching and teachers, an enormous potential opens for increasing learning through reducing the student's time spent on activities other than learning, lessening the aimless drift of students through prolonged undergraduate years, and challenging each student up to his or her learning potential.

This is not to blame the student for the financial and reputational crises of American higher education or to deny the possibility of some additional productivity through the traditional means of further trimming administrative costs or limiting the number of very small classes or requiring a full measure of effort from every member of the faculty and staff. But it suggests that

the principal productivity problem of higher education in America may lie neither in some presumed insufficiency of effort on the part of faculty, nor in some also presumed "bloat" of non-teaching staff, but rather in sub-optimal learning and less than fully engaged learners.

Learning is more productive when it masters a given body of knowledge or skills in less time and/or with less costly inputs. And learning that takes less time can cut not only the traditional costs carried by the institution, but the opportunity costs — i.e., the foregone earnings — borne by the student, who can enter the productive labor force faster with the degree in hand and begin making a truly substantive contribution to the nation's national product.

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II
The Problems of American Higher Education

The perspective of *learning productivity* addresses four major problems of American higher education:

1. Financial strains on colleges and universities, with revenue sources unable to keep up with rising costs;

2. Financial strains on parents and students, with tuitions and other costs rising faster than family incomes and with student work and debt loads mounting to dysfunctional levels;

3. Students entering college, or coming of college age, insufficiently prepared either for college or for the productive, mainstream work force; and

4. Inadequate learning in the undergraduate years of college.

This section examines each of these problems and how each might be addressed by efforts to enhance the productivity of student learning.

❖ ***Financial Strains on Colleges and Universities.*** The fundamental financial problem of colleges and universities is less their per-student costs, which are admittedly high, but more the upward trajectory of these costs: that is, higher education's built-in inflationary engine. A major part of this cost pressure is attributable to the absence of sustainable productivity increases from the substitution of capital for labor, as is characteristic of most of the goods-producing sector of the economy. As higher education's principal cost is for labor, its unit costs, as in the service sector generally, tend to track wages and salaries — which, in turn, tend to reflect the real growth of the economy and thus, in non-recession years, to exceed the rate of inflation.

A second contributor to higher education's cost trajectory is the powerful and ever present pressure for growth: for more programs, more courses in a given program, more opportunities for more students, more or better physical plant and equipment, and so forth. These pressures are legitimate. They reflect the needs of the economy and the imperative of social justice and expanded opportunities, as well as higher education's fierce meritocracy: always to do better and to grow in the esteem of colleagues, potential clients, and the general public.

At the same time, the revenue to meet these increased cost pressures comes over-whelmingly from only three sources: taxpayers, parents, and students. Each is seriously limited. All of the evidence of the 1980s, and thus far of the 1990s, is that tax funds will continue to be in short supply due to economic stagnation and tax resistance; and to the extent that there are increases in tax revenues, the queue of public claims upon them is long and compelling, including, e.g.: health care, environmental restoration, social services, housing and public infrastructure, not to mention federal deficit reduction. Thus, the likelihood of tax revenues, either federal or state, not merely keeping up with higher education's not inconsiderable inflation, but substantially increasing to cover the backlog of deferred maintenance and program restoration, to meet the higher levels

of education and training required by a technologically complex society, and to meet the enrollment pressures of expanding higher educational opportunities, is slim. Similarly, parental revenues seem to have peaked, with "tuition resistance" setting in — not to mention the decreasing relevance of parental revenues anyway to the growing numbers of older students or students from families with virtually no discretionary income. Finally, increased revenue from students, with debt loads and workloads already of national concern, will be difficult.

Except for a relatively small number of heavily-endowed and highly-selective private universities, the nation's public and private universities and colleges, absent some fundamental change in their way of doing business, would appear to be in for another decade of budget deficits, staff and program cuts, and deteriorating physical plants. The public policy concern is less the uncertain fates of these institutions, per se, than it is their diminishing capability to meet their state, regional, and local needs for increased enrollments, new academic programs, new contributions to technology and economic vitality, better work force preparation, and new public services. In this context, increased productivity of learning — i.e., meeting our increasing need for student learning objectives with no more faculty and staff — can be a key both to the continued financial viability of our colleges and universities and to their ability to meet society's increasing learning needs without commensurate real (i.e., inflation-adjusted) increases in resources.

❖ ***Financial Strains on Parents and Students.*** The cost to parents and students of an undergraduate academic year in residence at a SUNY campus in 1992-93 is more than $9,000. The cost of a year in a SUNY medical school for a New York State resident is about $15,000-$17,000. Costs at private colleges, of course, are higher: $12,000-$20,000 is an average range, but annual undergraduate costs at the most expensive colleges and universities are as high as $25,000, and a year at an expensive private medical school can be $40,000.

The consequences of these costs are varied and partly anecdotal, but are worrisome:

- Some students may be either dropping out or stopping out, unable to find the resources or unwilling to incur the additional levels of personal debt.

- Some young people, potential students, may be being turned away from the dream of a college education simply by the publicity about high costs and (frequently only alleged or threatened) government cutbacks in financial aid.

- Many students may want a particular public or private college away from home, but are now settling for the least expensive alternative, generally a public community college within commuting distance.

- Many students are incurring large debt loads — $10,000-$20,000 for the undergraduate years, and some as high as $50,000-$100,000 by the end of graduate or advanced professional education — with presumed pressures and distortions on type of practice, marriage, and other personal and professional plans. (SUNY's Health Science Center at Syracuse in 1992 reported average debts for medical school graduates, excluding undergraduate debt, of $46,500.[1] The University of Pennsylvania reported 1992 average medical school graduate debts of $57,372, with 37 percent having debts in excess of $70,000.[2])

- Many students are working long hours: 20 to 40 hours a week are not uncommon for students still carrying an alleged "full time" academic load. Other students are carrying partial loads or are dropping out for semesters or years to catch up financially and to put away some savings for their next semester or two of full or part-time study.

- Most students are incurring the very high, but often hidden, cost of delayed entrance into the higher-paying regular work force. For those students who do complete a baccalaureate, the average time to completion has risen steadily, and only

43 percent of first-time, full-time students who begin a baccalaureate program actually receive the degree within six years.[5] Ironically, the high annual costs may be causing a response — i.e., stopping out, or dropping to part time, in order to earn some money — that actually increases the real present value aggregate cost to the student by delaying his or her entry into the far better paying jobs that await the college degree holder.

❖ ***Insufficient Preparation in Secondary School, Either for College or for the Work Force.*** This is not the place to document the weaknesses of America's middle and secondary education. Many students are appropriately challenged, given good teachers and a good curriculum, and have the good fortune of a family and peer environment that are supportive of education. Too many, however, are not and do not. As a consequence, the American high school graduate, compared to the high school graduates of other countries today or to our own graduates of several decades past, is likely to be insufficiently prepared in mathematics, science, history, geography, and the knowledge of other languages or other cultures. Furthermore, the high school graduate or even the dropout who does not aspire to college is even more unready for today's technologically demanding work place.

The causes of these problems are many and complex, and some are rooted deep within our national pathologies of poverty, racism, family disintegration, and our seemingly diminished collective social conscience. But some of the inadequacies in secondary school preparation are reinforced by policies and actions stemming from higher education: specifically, *unclear expectations*, *inadequate standards*, and *insufficient rewards*.

First, we must make our expectations upon students and high schools unmistakably clear. If math at least through high school algebra and through what is often termed "pre-calculus" is essential for success at the elementary levels of most college curricula, and can be learned by virtually all high school students who are well-motivated and well-taught, then colleges

should say so, in unmistakable language, to high schools, school boards, parents, and students — the latter when they are in the seventh or eighth grades and annually thereafter. Likewise with second languages. Likewise with the ability to write clear and correct English and with an experience in a laboratory science.

Second, we must reinforce the clarity of our expectations with meaningfully rigorous *standards*, both for entry to, and success in, collegiate work. These must appropriately vary by the individual college. But there must be standards, well-known, toward which young people in middle and high school can aspire and that are presumably not able to be attained (at least not by most) without serious study. Standards for college entry that can be met by high school students who leave school daily by 1 p.m. with no homework are no standards at all.

It is no longer acceptable to resist standards and expectations as "elitist" or "discriminatory." In fact, nothing is so deleterious to learning as low standards or unclear expectations, and one of the most pernicious forms of discrimination is the assumption, sometimes unconscious, that certain children cannot learn as much or as fast and should therefore be spared rigorous expectations. Of course, there must be massive additional public spending to redress the damage done by deteriorated schools and years of public neglect. Of course, we must spend, and otherwise do whatever it takes, to get good teachers and good equipment into our decaying inner-city and rural schools. Of course, there must be second and third chances and special programs for those who have been left behind. But none of these actions can succeed without clear expectations and meaningful standards that reflect the worth, dignity, and very considerable potential of all children.

Finally, there must be rewards for good learning. This need not be the kind of competitive prize reachable only by the talented and lucky few, but a payoff attainable to all who learn at or near their capacities. One such reward for rigorous learning

at the secondary level (and including through the entire twelfth grade) would be the possibility of earning college credit. A major reward to such learning, aside from the satisfaction that should always accompany learning and aside from the cachet of being in an Advanced Placement class or being able to attend a college rather than a high school, is the ability to finish an associate degree or a baccalaureate degree that much sooner, and thus to begin a career or to get into (and out of) a graduate or advanced professional program that much sooner and with that much less debt — or at that much less financial burden to one's parents.

❖ ***Inadequate Learning in College.*** A final problem to which the concept of learning productivity brings some perspective and possible remedy is inadequate learning in college. The evidence is anecdotal and arguable, but widely believed. Too many students, it is alleged, are emerging after a degree, or less than a degree, actually knowing rather little and prepared for little in the way of productive employment. College may have been fun, and lots of maturation and out-of-classroom learning may (or may not) have taken place. But many employers, parents, and even graduates themselves question the amount of focused, purposeful learning that took place, at considerable expense to someone, during those supposedly "prime learning years."

Clearly and quite appropriately, learning will vary: by inherent intellectual ability, by preparedness, by motivation, by the skill and devotion of the professor, by the "fit" of learning style and teaching style, and by any number of other factors. The inadequacy in learning to which the concept of learning productivity brings a special perspective, though, is the inadequacy contributed to by insufficient time on task, or lack of concentration, whether at the hand (i.e., "fault") of the student, the professor, or the "system."

There is inadequate learning when a student finds his or her history or language course virtually duplicative of high school — and who takes it anyway (and is allowed to do so) because it is

an "easy ride." There is inadequate learning when a well-prepared and well-motivated student essentially completes the learning expected in the course by mid-semester and then coasts until the end.

Given a student's available time and willingness to learn, there is arguably a serious and pervasive inadequacy of learning when the academic year begins in early September, usually slowly, misses a few holidays, most of Thanksgiving week, a long Christmas-New Year break, a spring vacation, a couple of additional breaks and days off (including, for many students, most Fridays and all weekends), and then ends in early May for a three and one-half month summer break.

There is inadequate learning when students are reduced to filling their course rosters according to what is available or convenient rather than what is needed or even wanted. Learning is likewise inadequate when a student drops out to earn some money; or changes majors for the fourth time due to poor advising; or otherwise "drifts" in and out and through college with insufficiently clear and rigorous expectations or standards for progress toward his or her degree.

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III
Solutions: The Productivity of Student Learning

An important and hitherto insufficiently recognized part of the solution to the four problems listed above lies in a greater attention to the productivity of student learning. The learning productivity model is driven by ten assumptions, or propositions:

1. *Colleges and universities must become more productive: that is, produce more learning, research, and service at lower unit costs — more efficiently.*

Higher education probably could not remain isolated or exempt from today's imperative of greater productivity anyway.

Market and political forces alike are demanding more productivity from all colleges and universities: public and private, undergraduate and graduate, two-year and four-year, selective and less selective. The challenge is to become genuinely more productive — not just cheaper and shabbier and otherwise less costly.

What gives the productivity imperative even more impetus is higher education's agenda of unfinished business: the restoration of its plant and equipment, the maintenance of America's competitive position in basic and applied research, the upgrading of the work force, the expansion of the collegiate franchise, and the improvement of learning at all levels. The need is clear for more of higher education's product. Significant additional resources from taxpayers, parents, and students seem unlikely. By whatever means, then, American colleges and universities must become more productive.

2. *The search for increased "productivity" through the addition of still more students per class, or more scheduled courses per faculty member, or through further reductions in instructional and administrative support will not, by itself, yield significant, sustainable savings without unacceptable losses in quality or capacity.*

Critics hold that American faculty are preoccupied by research and other nonteaching interests and spend too little of their time teaching. According to such a perspective, the enhancement of productivity is conceptually simple — that is, increase course and class loads and reward faculty for the quantity and quality of their teaching rather than for their research or their scholarly reputation among their peers. This view is reinforced by the tendency to define the teaching workload only as the number of hours a week a professor may be standing in front of his or her entire class in formal session — as opposed to the hours spent in scheduled or unscheduled student advising, grading papers, preparing for class, preparing an altogether new course, studying to keep up with the field,

meeting with students, teaching graduate and postgraduate students in independent study, theses, or other research projects, etc. Thus, the official course load can look minimal, particularly to someone generally unfamiliar with the academy, and the solution to higher education's productivity imperative can seem deceptively simple.

But neither the problem nor the solution is as popularly portrayed. First of all, of approximately 825,000 United States college and university faculty polled in 1988, some 288,000 are community college or specialized institute faculty who normally teach five course loads or the part-time equivalent thereof. Arguably, their greatest need is for *lower* teaching loads and for *more* time to keep up with their fields; but by no stretch of anyone's imagination are they slighting teaching in favor of research. Another 180,000 or so are part time or temporary at four-year colleges or universities — generally with high teaching loads and little or no scholarly expectations. Of the slightly more than 350,000 full-time faculty at the four-year institutions, nearly half, or about 167,000 are in comprehensive or liberal arts colleges where the formal teaching loads alone (i.e., not counting advising, independent study, or other duties) are generally three or four courses.[4]

It is mainly in the nation's research universities, employing about one-fourth of the nation's full-time faculty, that formal teaching loads are at a level even to call into question. And in these universities — charged with the nation's scholarly leadership and unequivocally leading the world in the production of research and of graduate and advanced professional students — the overwhelming majority of the faculty are doing what they were appointed to do: teaching undergraduate and graduate students, keeping up with their fields, contributing to their fields, performing university, community, and national service, and maintaining America's commanding lead in worldwide scholarship.

Yes, these faculty could teach or advise more and do less scholarly research. But this alone does not make them more *productive*; it merely assigns them to *different jobs*. Similarly, their institutions would not necessarily be more productive; all we know for certain is that they would cease to be *research* universities. Perhaps the nation could function just as well with a few fewer of such institutions. But such a downsizing of the number of research universities and a wrenching conversion of some to essentially undergraduate institutions, whether foolish or wise (or even possible at all), would still do little for the overall productivity of American higher education.

More reasonably, one could look within any of our colleges and universities at those few faculty who are carrying a lightened teaching load in order to leave time for research, but for whatever reason are no longer producing any real scholarship. Some universities have already taken steps to recognize the changing strengths of faculty and to shift expectations and teaching assignments accordingly. More should do so. But the number of genuinely unproductive faculty who could begin to make significant new contributions to undergraduate learning by a simple increase in their teaching loads cannot be great. And the net increase to the nation's higher educational output, by whatever measure, cannot be great.

3. *The more substantial and sustainable productivity gains in higher education lie in measures that lead to more learning from the students rather than merely to increased workloads of faculty or of administrative and professional staff.*

This is the driving assumption of the learning productivity model: that we need to focus more on the student and his or her learning, and to be a little less preoccupied with, and critical of, the faculty (and all of the rest of the administrative, professional, and clerical support staff of our colleges and universities) in our quest for more productivity. The basic assumption is merely that the average student is not learning as much and/or

as fast as he or she can, and that some manipulation of how we organize and reward both teaching and learning can yield more learning for the resources invested and paid for by the taxpayer, parent, and student.

4. *Students, on average, can learn far more in any given span of time than they now do. Expressed another way, most students, with the appropriate curriculum, pedagogy, technological support, and incentives, can meet learning outcome goals in less time and at less cost than they presently do under our conventional instructional modes and incentives.*

This is a restatement of the basic learning productivity assumption, with special attention to the distractions, redundancy, and excessive non-learning time that has come to characterize so much of the undergraduate experience. This is not to say that all students can learn faster and more efficiently. Some fill their days and semesters and even the year very productively; some may need even more time than they are now taking to reach their learning objectives. But the demonstrable distractions, redundancy, and non-learning time in the current undergraduate experience — especially for those who are taking six or more years to achieve the baccalaureate — make it virtually self-evident that learning *could* take place much faster and with greater efficiency.

5. *More of our undergraduate teaching and learning must be individually-paced mastery learning, in which the level and content of learning is prescribed and the time necessary for mastery becomes the dependent variable — as opposed to our conventional mode of teaching and learning, in which the span of time (e.g., a 15-16 week academic semester) is established as the critical "given" and the actual learning is allowed to vary.*

The great barrier to efficient and thus productive learning, aside from the grossly excessive vacation periods, is the packaging of teaching and learning into fixed units of time: semesters or terms, generally of about 15 weeks of effective

teaching. The length of the semester we fix as given; the amount that is learned we allow to vary. If a student were to complete the learning goals of a fall semester course in, say, the third week in October, he or she is expected either to learn even more (a laudable goal) or perhaps, more realistically, to slack off and coast for the rest of the fall term. What very few colleges or universities are prepared to do, except possibly in some isolated special programs for special students, is to award the appropriate credit forthwith and move the student on to new learning objectives.

The concept is *mastery learning*, and has been discussed for years, particularly for elementary and secondary curricula. The key ingredients of mastery learning for the purpose of enhancing the productivity of collegiate learning are three: (1) the stipulation of clear, comprehensive, and measurable learning objectives; (2) assessment instruments that can test for mastery and be part of the teaching-learning process for students who have not yet sufficiently mastered the material; and (3) the capacity of the system to move the learner on to new and appropriate learning objectives after a particular set has been realized.

Mastery learning is usually associated with learning that is individualized and frequently self-paced. In self-paced learning, the student moves at his or her own pace through the requisite learning, which may involve reading, writing, listening to lectures, participating in classes, creating, problem-solving, or whatever — until the objectives are mastered, with periodic assessments along the way, some of them self-administered, to measure progress, detect weaknesses, prescribe strengthening exercises, and finally to certify mastery.

Self-paced mastery learning is clearly more appropriate, or is at least more easily conceptualized, for certain kinds of learning: basic language and mathematics, for example, or any learning that requires either rote memorization or the performance of an easily described and performed skill. Higher level learning — complex syntheses of concepts or complex problem-

solving in authentic human situations — is far more difficult to stipulate, assess, and package for self-pacing. If the goal is more productive learning overall, rather than mastery or self-pacing for their own sake, it would be best to focus the self-pacing only on the kinds of learning objectives for which this pedagogy makes the most sense and not attempt to force those courses or learning goals that are too elusive or resistant.

6. *The potential of individualized, self-paced instruction has been greatly enhanced in just the last few years through greatly improved and more affordable educational technology.*

Mastery learning has always been practiced. However, it has historically taken the form either of independent study or the classic tutorial. These modes are probably capable of foreshortening the total time required for a degree, although time shortening itself has rarely been the objective. And, even if tutorials and heightened individualized instruction were aggressively to seek faster average time to the completion of learning goals, these traditional forms are still likely to be more expensive, and thus less productive, because of the rich faculty/ student ratios and other attendant costs. Individualized, self-paced learning is only generically more productive when the variable labor costs can be cut — that is, when the faculty/student ratios can be made more lean, without sacrifice of learning.

It is only in the most recent years, with the most recent technologies of interactive personal computers, sophisticated software, and storable video, that educational technology has given us the capacity to replicate the individually-paced mastery learning of the personal tutor in a form that is potentially more efficient and more productive. Fisher claims that learning technology aggressively implemented could reduce by one-third the time it takes to master today's curriculum.[5] Technology does not guarantee productivity; but coupled with changes in pedagogy, economies of scale, and a paradigm shift to individualized, self-paced mastery learning, technology can make greater learning productivity possible.[6] (In-house corporate training programs,

where mastery of content truly counts — as does control of costs, including the opportunity cost of time away from the job — provide an ideal context in which to test the theory of learning productivity without the constraints of educational ideology, tradition, and the other time-consuming tasks we expect of faculty in academic settings. Corporate "accelerated learning" demonstrates conclusively the potential of enhanced *learning productivity.*)

7. *Undergraduates should be required and assisted to focus their studies more expeditiously — and discouraged from excessive experimentation and "drift."*

There are undoubtedly some virtues in the very American tradition of allowing, and even encouraging, nearly unlimited undergraduate curricular experimentation, changes of major field, and the interruption and subsequent resumption of one's collegiate learning. Arguably, this pattern, unique in the world, is also enormously costly, both for the faculty and facilities that are required for the average undergraduate degree, and also for the students, who remain out of the real work force for months and years more than necessary.

There will be some who will react with dismay and even anger at the notion that teaching and learning ought to be more productive, or "speeded up," or that the endless curricular experimentation and change of majors characteristic of the American undergraduate experience are anything other than intellectually idyllic. It is true that some learning needs to be slow, methodical, and even languorous. And it is a virtue of American higher education that students do have freedom to explore, to try some new fields, and to change their minds. But the perspective of *learning productivity* begins with the assumption that higher education must become more productive, somehow. And the cost of the extraordinary (and apparently increasing) degree of curricular "drift" and experimentation in American higher education is being borne either by future young people who will not have a place at all in American higher education

because our colleges and universities will be full to overflowing, or by students who will incur even greater college debt at the same time that their slow pace of degree completion keeps them out of better-paying jobs. At the very least, we need a better balance between the goals of expeditious completion and greater productivity, and the intellectual virtues of intellectual exploration and the endlessly-open academic door.

8. *Year-round study alone, quite apart from the intensity or concentration or productivity of the time during which learning is supposed to be taking place, could shorten the time to the degree.*

Most colleges and universities have summer sessions that, if used to the fullest, could shorten the time required for the baccalaureate. Many have attempted to expand the use of the faculty and the facilities through "trimesters," or other 11 or 12-month academic calendars, frequently with various "carrots and sticks" to induce more year-round attendance in the face of the American undergraduate's traditional preference for summer fun or summer employment over summer school.[8] Still, however, the dominant undergraduate pattern is for a long summer break — no longer to work the family farm, perhaps, but to earn some money (usually at a low-paying job) or to travel or to rest. The attacks on the length of the public school year have not yet reached higher education and its even more truncated academic calendar — but they will.

9. *Many if not most young people age 16-18 are capable of college-level work, given the proper curriculum, standards, and teachers — and the proper motivation.*

This statement is probably a virtual biological truism. Clearly, high school students are capable of learning at college levels, as attested by the more than 388,000 students in 1992 who took over 580,000 Advanced Placement exams, with some 380,000 scores of "qualified" or higher.[9] In fact, college-bound students in most countries of the world are expected to know by the time they finish secondary school what Americans expect to

learn during their first year or two of college. One of the easiest ways of reducing the average time spent attaining the baccalaureate degree would be to increase the college-level learning during the high school years.

10. *Graduate and advanced professional education — in most fields and for most students — should begin at an earlier chronological age, and with less (but better focused) undergraduate prerequisite learning than at present.*

A corollary to the prolongation of the undergraduate experience in America is the deferral of even the start of most graduate and advanced professional learning until the completion of the baccalaureate — at age 22 if the baccalaureate has taken only four years, and increasingly at a much later age after stopping in and out of college several times or extending the time to the degree by several changes of majors. Again, this is partly, and wonderfully, a reflection of the openness of the American higher educational system: the virtual absence of closed doors or irrevocable steps. But the monetary cost is high — to the taxpayer, the parent, and the student. And if the preceding assumptions are valid, then it stands to reason that more students can and should be starting their medicine, law, pharmacy, and advanced graduate work at an earlier age, intent on entering their initial careers while younger and less encumbered with debt — but of course continuing to learn throughout their lifetimes with refresher courses, continuing professional education, and more self-paced independent learning.

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IV
Implementation:
Increasing the Productivity of Student Learning

Learning productivity is more a perspective than a program. Yet there are concrete, practical steps that can be taken by a college or university or system wanting to increase the produc-

tivity of its student learning. Like most reforms in higher education, the likelihood of success will be expanded as:

- The president or chancellor and governing board are committed.

- The faculty — the leadership, rank-and-file, unions, and faculty senates — are involved in design and implementation, and trust that the concept is neither a denial of the worth of the traditional faculty role, nor an attack on the liberal arts or the freedom of students to experiment academically and intellectually, nor simply a "speed up" of teaching or an attack on research time.

- A venture is launched with sufficient critical mass to succeed, to require behavioral change throughout the system, and to commit the institution not merely to "an experiment" (from which it is too easy to "decommit"), but to a presumably permanent, serious change.

- The overarching goal of *productivity enhancement* is not forgotten — and especially is not superseded by more comfortable goals such as "a better quality experience for each student," which is utterly worthy, but is not likely to prove to be significantly enhanced by a venture that begins with an assumption that higher education must become more efficient and productive.

- Students and parents, as the consumers, become convinced that expeditious degree completion is a good thing and to be sought and even demanded — as opposed to the currently prevailing consumer signals that seem to want *even more prolonged* undergraduate education with lots of time for intellectual and academic exploration, part-time work and income earning, personal maturation and self-growth, or the serious pursuit of extracurricular activities such as student government or intercollegiate athletics.

With these caveats in mind, a program to enhance the productivity of student learning might begin with any or all of the following elements:

1. *Encouragement of more college-level learning during the high school years.*

Such learning can take place either in the high schools, as in the traditional and fast-growing Advanced Placement program or in individual colleges or universities certifying certain courses by certain teachers in certain high schools as worthy of their college credit. Or, it can take the form of high school-age students attending a nearby college full or part time before graduating from the high school or formally matriculating in the college. But such learning possibilities should go beyond the most well-prepared and academically ambitious students, who have traditionally populated the Advanced Placement (AP) courses, to include those students who may want earlier entry into the work force, or perhaps an associate degree program at their community college. These students, too, can do legitimate college-level work while in high school, or can spend time before their high school graduation at their local community college or in supervised experiential work place learning, as in the federally-sponsored Tech-Prep programs.[10]

This element of *learning productivity* will require close collaboration between secondary and higher education. Financial disincentives on both sides must be countered: the fear on the part of secondary schools that they may lose state aid, and thus teaching positions, if they lose any significant portion of enrollment credit for the young student; similarly, the fear of colleges for the lost tuition or lost FTE (full-time-equivalent) enrollment credit from the earlier graduation of those they enroll with AP credits.

Obvious challenges of quality control and integration of learning objectives must also be met. But the goal should be a substantially strengthened secondary school curriculum, a greater incentive to rigorous learning, especially during the high school senior year, more productive use of the student's time, and some relief to the currently overloaded introductory classes in the collegiate freshman year.

2. *Redesign of curricula, course schedules, and faculty assignments to courses in order to assure students access to all courses necessary to their degree at the proper time and in the proper sequence.*

This is the element of *learning productivity* that is probably the most easily advanced as a simple "reform," independent from the more wrenching and far-reaching changes in course and calendar design required by some *learning productivity* initiatives. Colleges and universities should pledge that no student should ever have to delay graduation because of the unavailability of a key course. All teaching assignments should be subservient to the needs of students and to their timely progress through the institution's learning objectives.

3. *Stipulation of clear and measurable learning outcome expectations for each "course."*

This is one of the oldest educational reforms "on the books." Some progress has been made in recent years in stipulating outcomes for such relatively structured and content (as opposed to process) rich disciplines as mathematics or languages, whose goals are more easily measurable. History or literature or the social sciences have proven to be formidable challenges. The greatest difficulties have been in obtaining departmental consensus on what the graduating major should be able to know and do — a precursor task to the stipulation of learning outcomes for those disciplinary courses that are building blocks for the major.

A virtue to this element is that it should be done anyway, for obvious reasons of good pedagogy, and is a task on which many colleges and individual faculty members are well advanced. If the attempt at enhanced learning productivity gives impetus to this goal, and yet otherwise fails to reduce significantly the costs per student or per graduate, there will nevertheless have been an almost certain increase in the quality of teaching and learning.

4. *Maximization of individual and self-paced instruction, for mastery learning, to achieve shorter average course completion times.*

This does not signal the end of the large lecture or the medium-sized lecture discussion or the seminar or the tutorial. But it does suggest that more of the purely didactic presentation of material can almost certainly be relegated to interactive programmed instruction through the personal computer, television, and video cassette recorder, to be called forth at the discretion of the learner. Examinations should be more self-administered, interactive instruments for teaching, through which students learn their strengths and weaknesses and receive suggestions on next learning steps. Far from isolating students, self-pacing can encourage cooperative learning, even among students bound together only by E-mail. The time of the professor can be spent more in the creation of new software and other learning materials, in monitoring individual student progress, and in the kinds of small group learning sessions for which there is no technological substitute for a professor and a blackboard.

5. *Redesign of the academic calendar for year-round learning in modules of flexible lengths of time.*

Self-pacing and the faster mastering of material will mean little unless the college or school or department is prepared to present another module of learning as soon as one has been mastered and unless, with time for reasonable breaks and an annual vacation, the academic calendar can be essentially year-round. For this reason, a very small demonstration program would probably provide an insufficient critical mass of learning opportunities to test the *learning productivity* hypothesis. An entire general education and basic skills curriculum, however, could possibly be re-engineered to feature individualized, mastery learning modules, with incentives and opportunities for self-pacing and acceleration. Or, a department could possibly organize its undergraduate major or even a portion of its graduate core around a self-paced mastery learning model. The point,

though, is that this element of student *learning productivity* requires a strong commitment from the faculty to change profoundly at least some of the behavior and procedures that have characterized higher education in most institutions throughout modern times.

6. *Redesign of "workload" expectations for faculty to encourage faster student progress.*

It is well to recall again two key assumptions of the *learning productivity* model: (a) there must be productivity advances in higher education, meaning that, at least ultimately, there will be more students, or at least more student credit hours earned, per faculty member; and (b) faculty should *not* be expected to increase significantly the hours they spend teaching as opposed to pursuing their scholarship or service. In short, the *learning productivity* model is designed to get *different*, but not necessarily *more*, teaching from the faculty.

If the teaching portion of the semester's workload cannot be expressed merely as, e.g., three courses, eighteen advisees, and the prēparation of a new course for the following semester, how should it be expressed? If the academic year is to be virtually year-round, how are faculty to be compensated for the summers they will no longer have for their research or travel or extra teaching — which may be a regular and expected supplement to their salaries? How can the faculty member be rewarded for increasing, on average, the pace of students' learning — while continuing to be held accountable, as always, for the quality of learning and the integrity of the degree? William Prokasy writes that the new pedagogy "... will reshape operating policies and procedures, resource allocation, distribution of faculty time, and the role of a curriculum .... [Among other things,] governing boards and institutions will have to abandon the classroom hour definition of instructional responsibility if we are to take advantage of our new technology."[11]

These are issues and details that can only be worked out with strong leadership and perhaps some risk-taking from academic administrators and faculty and, where they exist, from faculty unions. There would seem to be no question, however, but that a new pattern of teaching and learning is possible, with year-round instruction, a combination of self-paced individualized instruction and traditional courses, incentives for the student to accelerate as much learning as is possible, an abundant use of educational technology and new pedagogy, and new ways of assigning and accounting for faculty time. The challenge will be to hold onto the public and private resources being invested now in higher education, while building faculty allegiance to these considerable changes and a consumer (parent and student) demand for the new and more efficient learning styles. Failure to do so may further erode both the public (i.e., taxpayers) and private (i.e., tuition payers) sources of revenue before the new learning productivity can take hold and demonstrate its benefits.

7. *Redesign of student aid and college tuition payments to reduce financial disincentives to year-round study and faster baccalaureate completion.*

The three-year baccalaureate has always been an option, at least for the well-prepared and well-motivated student who picked up several Advanced Placement courses in high school, took a heavier than average load during most regular semesters, and picked up another nine to twelve credits in the summers. Similarly, early entry into graduate and advanced professional programs, particularly medical schools, has been an option for years for the top undergraduates with appropriate pre-med majors. What is surprising, particularly in light of the presumed mounting concern over costs and student debt loads and in light of a general awareness and concern about the length of time required today to get a graduate or advanced professional degree, is that there has not been more consumer pressure for the foreshortened degree. In fact, many students for whom

earlier graduation is virtually in hand are said to be extending rather than accelerating their undergraduate education. Although the *learning productivity* model claims advantages to the students and their parents, one of the clear challenges to the concept will be the building of student incentives to increase their concentration on learning and accelerate their progress toward their degrees.

Other students will undoubtedly claim that faster graduation, particularly if it entails less term-time employment and summer saving opportunities, is financially out of reach. *Learning productivity*, absent a change in the way student aid is given and college tuition charged, may be a luxury for the affluent, adding the advantages of a head start on graduate school and a head start in the adult labor market to all of the other advantages they already bring to college.

In order for student and family financial incentives to work for rather than against accelerated learning:

- The cost to the student of summer enrollment — tuitions, room, board, etc. — must be priced advantageously to the student, although not, of course, at a true loss to the institution.
- Student aid, including both grants and loans, must be available for year-round study.
- The net cost to the student — i.e., tuition and all living costs minus grants and the present value of loan subsidies — should encourage full-time study and degree completion.
- Tuition should be lower for so-called "overloads," lower for courses completed on self-paced, accelerated basis, and lower in the aggregate for students who complete baccalaureate requirements in less than four years.
- The determination of "need" for the calculation of financial aid should cover the costs of personal software, self-administered tests, computer time, and other expenses of self-paced instruction.

8. *Assurance of earlier entry, as appropriate, into graduate and advanced professional study.*

For increasing numbers of students, serious preparation for productive employment begins only at the level of graduate or advanced professional study. This moment, for most students, can come at an earlier age, especially as a reward for more efficient and productive undergraduate learning. In fact, the major contribution of graduate and advanced professional schools to the greater productivity of student learning might be simply to not resist or otherwise undo the acceleration that may be achievable at the secondary school and undergraduate years. Graduate programs must not discriminate against students who have moved through their baccalaureate programs with substantial amounts of self-paced mastery learning. Graduate programs must not attempt to "remediate" such undergraduates or reassess learning that has already been certified to have been mastered. They must not seize on the younger age or supposed eagerness to learn of these accelerated undergraduates by simply lengthening the graduate or advanced professional program.

Graduate schools could be an enormously positive force behind, and major participants in, a *learning productivity* movement. Historically, more learning at the graduate level has been individualized and self-paced anyway. A school that built upon this tradition both by attempting to concentrate and shorten its own learning, and also by rewarding students coming out of an accelerated undergraduate program, could do much to advance the cause of more productive student learning.

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V.
Learning Productivity: A Brief History of the Time-Shortened Degree, or "Learning From Failure"

Proposals for time-shortened degrees and related forms of more productive learning have been around for at least 30

years. They enjoyed a great flurry of attention in the late 1960s and early 1970s, a movement both reflected, and contributed to, by the influential Carnegie Commission on Higher Education. In its 1971 report, *Less Time, More Options*, the Commission recommended "that the time to get a degree be shortened by one year to the B.A. and by one or two more years to the Ph.D. and to M.D. practice."[12] In its 1972 report, *The More Effective Use of Resources*, the Commission translated its recommendation to an estimate of potential savings:

> The trend toward acceleration of undergraduate education, whatever form it takes, will result in substantial economies for students — in direct educational costs and in reduction of the length of time during which earnings must be foregone .... The impact on institutional expenditures in higher education will be more complex .... We estimate that, if all institutions were to adopt a straightforward three-year B.A., there would be a reduction of only some 10 to 15 percent in total undergraduate enrollment and in institutional expenditures on undergraduates, as compared with the situation if the four-year B.A. were generally retained.[13]

Time-shortened degree experiments in the early 1970s were announced by the California State University System, the State University of New York, and the Wisconsin State University System. Pittsburgh and Florida State attempted to implement year-round study with trimesters. Princeton, Yale, Northwestern, George Washington, and St. Louis Universities began programs, usually coupling accreditation of high school learning with more summer study, to foreshorten the time to the baccalaureate. A number of smaller private liberal arts colleges did likewise: Ripon, Stephens, Webster, and others.[14]

For a variety of reasons, nearly all of these (and many other) programs failed to take hold and were either abandoned altogether (sometimes when the facilitating foundation grant ran out), or were relegated to small and generally isolated programs

with a few creative faculty and a handful of highly-motivated students, often retaining the original aura of innovation and individualization, but no longer connected in any significant way to the goal of greater productivity or even, necessarily, to the time-shortened degree. Neither students nor parents, it turned out, were all that interested in graduating early — at least not sufficiently interested to accept year-round study.[15] Many institutions found that costs increased; public institutions discovered state funding formulas or other rules and regulations that were too resistent to change and to flexibility.[16] Most faculty, understandably, were unenthusiastic to begin any "experiment" the purpose of which was to enable either the institution or the nation to get by with fewer of their professional colleagues. In the final analysis, experiments aimed at shortening the time to the degree suffered either from a lack of sustained consumer demand, a lack of internal agreement on the goals of the experiment (and thus on any way to judge "success" or "failure"), or simply from the absence of any convincing demonstration that some generally agreed upon goals were being met.

Much more recently, the "three-year baccalaureate" has reemerged as a fancy in the eyes of journalists and editorial writers, stimulated by the provocative musings of Oberlin's President Frederick Starr[17] and Stanford's President Gerhard Casper.[18] The most substantive and comprehensive recommendations were released in November 1992 by the Virginia Council of Higher Education. The Virginia Council's study and recommendations stemmed from related state legislative mandates to study: (1) the potential for increasing college-level and college-credit work in high school, (2) the barriers to timely college graduation, and (3) the feasibility of a three-year baccalaureate. The study and recommendations, reflecting much the same concerns and thinking that has been animating the staff of the Central Administration of the State University of New York, urged attention to required course availability, expansion of summer offerings, better advising, more rigorous entry stan-

dards at the baccalaureate degree campuses, more efficient articulation between community colleges and senior colleges, and the expanded use of technology.[19] With regard to the expansion of college-level courses in high school, for example, the Virginia Council concluded "... that it is now possible for a student to complete virtually any 120-credit college degree program in three years by taking advantage of the programs ... that grant both high school and college credits for courses taken in high school.[20]

It would seem, then, that attention may in the 1990s once again be turning to some of these familiar themes of year-round calendars, three-year baccalaureates, and other elements of what this paper has described as *learning productivity.* But no major traditional college or university has yet made the all-out commitment that would be necessary to yield measurable and sustainable advances in *learning productivity* — defined as more learning for the same costs, or equal learning for less cost.

As the State University of New York contemplates a future in which the demand for places is certain to grow and the state and tuition-generated resources likely to be stable, at least in inflation-adjusted dollars, the case grows strong for a fresh look at enhanced learning productivity, through fundamental and collaborative changes in the way we teach and our students learn.

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Notes

1. Data from State University of New York Office of Financial Aid Services.

2. "Endowing Penn Med Tuition." *Almanac*, University of Pennsylvania, January 19, 1993.

3. State University of New York Office of Planning and Policy Analysis.

4. United States Department of Education data as reported in *The Chronicle of Higher Education Almanac*, August 26, 1992, p. 28.

5. Francis Dummer Fisher, "Higher Education Circa 2005: More Higher Learning, But Less College." *Change*, January/February 1987, p. 43.

6. See Carol A. Twig, "Improving Productivity in Higher Education: The Need for a Paradigm Shift." Saratoga Springs, New York: Empire State College, 1992.

7. See Jack E. Bowsher, *Educating America: Lessons Learned in the Nation's Corporations*. New York: John Wiley, 1989.

8. See David C. Montgomery, "The Encouragement of Summer Enrollment." *College and University*, Summer 1982, pp. 353-364; and Clarence A. Schoenfeld with Donald Zillman, "Summer Term Problems and Prospects." Journal of Higher Education, October 1967, pp. 401-403.

9. The College Board, *AP Year Book* 1992-93. New York: The College Board, 1992, p. 23.

10. For an excellent and very recent discussion of college-level learning during the high school years see the Virginia Council on Higher Education, *The Continuum of Education*. Richmond: Commonwealth of Virginia Council of Higher Education, November 10, 1992.

11. William F. Prokasy, "The New Pedagogy: An Essay on Policy and Procedural Implications." *Innovative Higher Education*, Spring/Summer 1991, pp. 109 and 111. See also Bruce M. Bradbury, "Administering Innovative Academic Credit." *College and University*, Summer 1982, pp. 371-406.

12. The Carnegie Commission on Higher Education, *Less Time, More Options: Education Beyond the High School.* New York: McGraw-Hill Book Company, 1971, p. 15.

13. The Carnegie Commission on Higher Education, *The More Effective Use of Resources.* New York: McGraw-Hill Book Company, 1972, p. 53.

14. *Ibid.*, pp. 50-52.

15. See Montgomery, *op.cit.*; and Schoenfeld, *op.cit.*

16. See Bradbury, *op.cit.*

17. S. Frederick Starr, "Tuition Relief for the Middle Class: Three-Year College Programs for Undergraduates." *New York Times*, October 6, 1992, Op Ed Page. See also Starr, "The Three-Year B.A. Degree at Oberlin." Oberlin, Ohio: Oberlin College, February 22, 1993.

18. Gerhard Casper, "Puzzles of Higher Education." Remarks delivered at 1993 Outlook Conference of The Bay Area Council, Stanford University, 1993.

19. Virginia Council on Higher Education, *op.cit.*

20. *Ibid.*, p. 2.

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